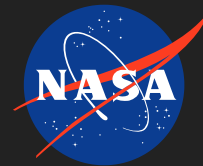


Transmission and Distribution of Photosynthetically Active Radiation (PAR) for Biomass Production in Exploration Missions [7216-050],

Phase I

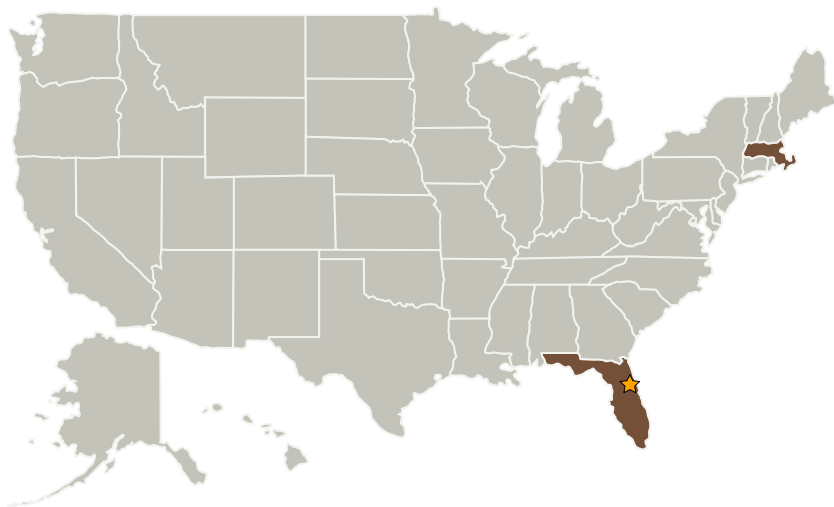
Completed Technology Project (2006 - 2006)



Project Introduction

Physical Sciences Inc. (PSI) proposes to develop a plant lighting system which collects, transmits and distributes photosynthetically active radiation (PAR) for biomass production in planetary and transit missions. In this system, solar light or electric lamp light is collected by reflector optics and focused at the end of an optical fiber cable. The light is filtered by a selective wavelength filter to reject the non-PAR spectra to minimize heat generation within the plant growth chamber. The PAR spectra are transmitted to the plant growth chamber where the light is uniformly distributed over the plant growth area at optimum intensities. Key features of the proposed system are: (1) the PAR can be transmitted via a flexible optical fiber cable to plants away from the light source; (2) only the PAR will be transmitted to the plant, minimizing the thermal loading in the plant growth chamber, while the non-PAR spectra can be converted to electricity by means of low band-gap PV cells; (3) the low profile light diffuser makes more volume available for plant growth; and (4) the electric light source can be chosen for the best system efficiency and can be placed at the location best suited for thermal control.

Primary U.S. Work Locations and Key Partners



Transmission and Distribution of Photosynthetically Active Radiation (PAR) for Biomass Production in Exploration Missions [7216-050], Phase I

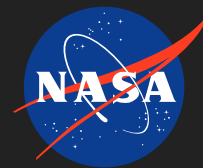
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Transmission and Distribution of Photosynthetically Active Radiation (PAR) for Biomass Production in Exploration Missions [7216-050],

Phase I

Completed Technology Project (2006 - 2006)



Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Physical Sciences, Inc.	Supporting Organization	Industry	Andover, Massachusetts

Primary U.S. Work Locations	
Florida	Massachusetts

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.3 Human Health and Performance
 - └ TX06.3.5 Food Production, Processing, and Preservation